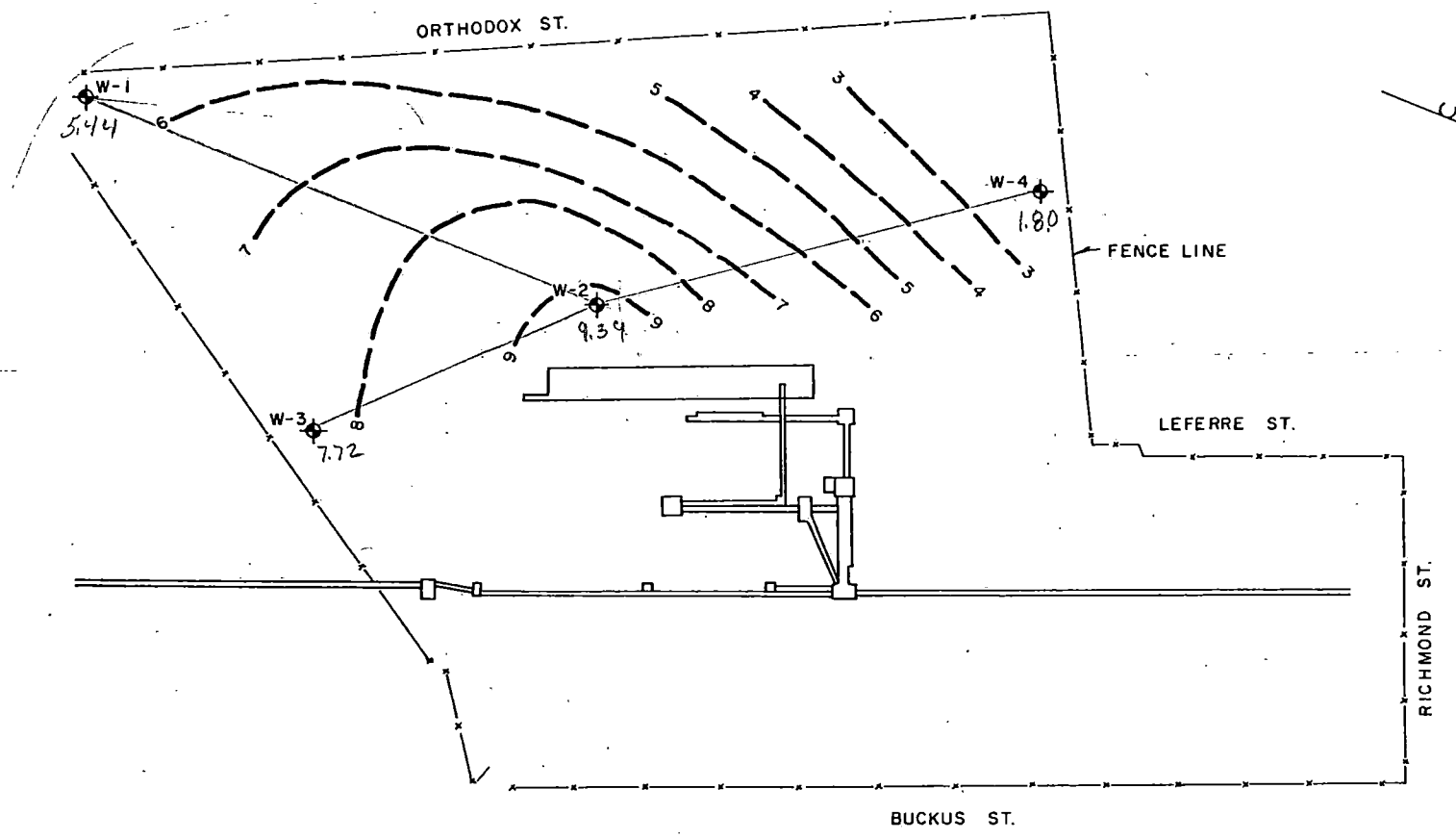
Plates



LEGEND:

MONITORING WELL

4 GROUNDWATER CONTOUR

GROUNDWATER ELEVATIONS, JUNE 26, 1985
PHILADELPHIA COKE, INC.
PHILADELPHIA, PENNSYLVANIA

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By	T. P.	SCALE IN FEET 0 200	Date 9/10/85
Checked	T.W.T.		Job 84C2145

PLATE 1

Appendix A

RMC ENVIRONMENTAL SERVICES
Environmental Chemistry Laboratory, Fricks Lock Rd., RD # 1, Pottstown, PA 19464 (215) 326-9662

CERTIFICATE OF ANALYSIS

LABORATORY NO: See Below **RECEIVED:** 26 June 1985 **REPORTED:** 7 August 1985

CLIENT: Woodward-Clyde
5120 Butler Pike
Plymouth Meeting, PA 19462

Date Sampled: 6/26/85
Sampled by: NA

SAMPLE DESCRIPTION: Philadelphia Coke

Parameter	Units	W-1 RMC#1482-85	W-2 RMC#1483-85	W-3 RMC#1484-85	W-4 RMC#1485-85	Field Blank RMC#1486-85
Alkalinity	mg/l	251	1093	44.2	314	<1.0
Ammonia	mg/l	333	1260	13.1	60.2	<0.02
Coliform, Total	Colonies/100 ml	13	2400	1	8	---
Biochemical Oxygen Demand	mg/l	**	**	**	**	**
Total Organic Carbon	mg/l	5.97	7.67	5.51	3.16	1.29
Chemical Oxygen Demand	mg/l	573	1856	57.3	269	<7.0
Chloride	mg/l	416	1633	14.8	152	<3.0
Cyanide	mg/l	38.0	120	0.001	16.8	<0.001
Fluoride	mg/l	1.0	1.5	0.47	0.08	<0.05
Aluminum, Dissolved	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic, Dissolved	mg/l	<0.001	0.026	<0.001	0.008	<0.001
Barium, Dissolved	mg/l	0.5	<0.5	<0.5	0.5	<0.5
Chromium, Dissolved	mg/l	<0.004	0.016	0.002	0.006	0.003
Iron, Dissolved	mg/l	49	2.69	<0.05	62	<0.05
Lead, Dissolved	mg/l	<0.001	<0.001	<0.001	0.002	<0.001
Manganese, Dissolved	mg/l	12	0.71	1.4	4.7	<0.05
Mercury, Dissolved	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005
Selenium, Dissolved	mg/l	0.005	0.003	0.003	0.004	0.003
Silver, Dissolved	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium, Dissolved	mg/l	144	430	53	184	<0.2
Total Organic Halogens	µg/l	19	69	7	18	29
Herbicides:						
2,4-D	µg/l	<2.5	<2.5	<1.0	<1.0	<1.0
2,4,5-TP	µg/l	<10	<10	<1.0	<1.0	<1.0
Pesticides:						
Lindane	µg/l	<0.003	<0.03	<0.003	<0.003	<0.002
Endrin	µg/l	<0.022	<0.22	<0.022	<0.022	<0.027
Methoxychlor	µg/l	<0.049	<0.49	<0.049	<0.049	<0.058
Toxaphene	µg/l	<0.098	<0.98	<0.098	<0.098	<0.020
Phenols	mg/l	0.01	36.9	<0.005	0.014	0.005
pH	Standard	6.40	7.45	6.19	6.57	6.05
Total Dissolved Solids	mg/l	2830	3870	921	1320	18
Specific Conductance	µmhos/cm@25°C	4094	9929	1097	1777	1.5
Sulfate	mg/l	1675	2512	420	511	<15
Nitrate	mg/l	<0.005	<0.005	10.5	<0.005	<0.005

**Laboratory Accident

Approved by: Kyle F. Gross
Kyle F. Gross, Supervisor
Environmental Chemistry Lab

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Field Blank	DATE ANALYZED	7/12/85
RMC I.D.	1486-85	ANALYZED BY	KFG

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Lodge

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Field Blank	DATE ANALYZED	7/12/85
RMC I.D.	1486-85	ANALYZED BY	KFG

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	<5 ND
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Lodge

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Field Blank	DATE ANALYZED	7/2/85
RMC I.D.	1486-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2
methylene chloride	<1.0	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0
chloroform	<1.0	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	0.2
1,1,1-trichloroethane	<1.0	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Kyle F. Gross

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Trip Blank	DATE ANALYZED	7/2/85
RMC I.D.	1487-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	<1.0	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0
chloroform	1.0	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2
1,1,1-trichloroethane	<1.0	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1]1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Kyle T. Gross

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-1	DATE ANALYZED	7/12/85
RMC I.D.	1482-85	ANALYZED BY	KFG

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Lodge

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-1	DATE ANALYZED	7/12/85
RMC I.D.	1482-85	ANALYZED BY	KFG

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	13
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	9.5
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5	benz(a)anthracene	14
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	6.7
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	84	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard A. Lodger

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Well #1	DATE ANALYZED	7/2/85
RMC I.D.	1482-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	<1.0	benzene	1.3
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	0.2
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Kyle T. Gross

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-2	DATE ANALYZED	7/12/85
RMC I.D.	1483-85	ANALYZED BY	KFG

ACID COMPOUNDS

	µg/l
phenol	21
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	255
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-2	DATE ANALYZED	7/12/85
RMC I.D.	1483-85	ANALYZED BY	KFG

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	33	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<10 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<10 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<10 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<10 ND	phenanthrene	14
hexachloroethane	<10 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<10 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<10 ND	fluoranthene	<5 ND
isophorone	<10 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<10 ND	pyrene	6.5
1,2,4-trichlorobenzene	<10 ND	butyl benzyl phthalate	<5 ND
naphthalene	116	benz(a)anthracene	25
hexachlorobutadiene	<10 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<10 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<10 ND	bis(2-ethylhexyl)phthalate	<5 ND
acenaphthylene	32	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	76	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	58	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Well #2	DATE ANALYZED	7/2/85
RMC I.D.	1483-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2
methylene chloride	<1.0	benzene	234
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	76
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	5.1

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Kyle T. Gross

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-3	DATE ANALYZED	7/12/85
RMC I.D.	1484-85	ANALYZED BY	KFG

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-3	DATE ANALYZED	7/12/85
RMC I.D.	1484-85	ANALYZED BY	KFG

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	<5 ND
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Well #3	DATE ANALYZED	7/2/85
RMC I.D.	1484-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2
methylene chloride	<1.0	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Kyle T. Gross

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-4	DATE ANALYZED	7/12/85
RMC I.D.	1485-85	ANALYZED BY	KFG

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Lodge

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	W-4	DATE ANALYZED	7/12/85
RMC I.D.	1485-85	ANALYZED BY	KFG

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	5.8
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward-Clyde	DATE RECEIVED	6/26/85
CLIENT I.D.	Well #4	DATE ANALYZED	7/2/85
RMC I.D.	1485-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2
methylene chloride	<1.0	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2 ND
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: W. F. Haas

Appendix B

TABLE 4

SUMMARY OF PRIORITY POLLULTANT ORGANIC COMPOUNDS DETECTED(1)
FIRST QUARTER SAMPLING
APRIL 8, 1985

Well	W-1	W-2	W-3	W-4	Field Blank	Detection Limit
Acid Compounds						
Phenol	ND	2,710	ND	ND	ND	10
2,4-dimethylphenol	ND	27,600	ND	ND	ND	10
Volatile Compounds						
Methylene Chloride	ND	6.2	3.8	3.4	ND	1.0
Benzene	ND	143	ND	ND	ND	1.0
Toluene	ND	60	ND	ND	ND	0.2
Ethylbenzene	ND	3.0	ND	ND	ND	1.0
Base/Neutral Compounds						
Nitrobenzene	ND	90	ND	ND	ND	5
Bis (2-chloroethoxy) methane	ND	15	ND	ND	ND	5
Bis (2-ethylhexyl) phthalate	BMDL	ND	12	8.5	17	5

(1) Results in parts per billion (ppb)

BMDL = Below Minimum Detection Limit
ND = Not detected

TABLE 5

SUMMARY OF WATER QUALITY PARAMETERS
APRIL 8, 1985 SAMPLING ROUND

Parameter	Units	W-1	W-2	W-3	W-4
Alkalinity, Total	mg/l	73.1	1040	65.5	89.8
Ammonia, Nitrogen	mg/l	56	917	14.3	20.7
Total Coliform	Colonies/100 ml	100	1800	400	2000
Biochemical Oxygen Demand	mg/l	6.6	220	2.4	37
Total Organic Carbon	mg/l	8.7	5.6	6.7	130
Chemical Oxygen Demand	mg/l	48	1170	12.7	44
Chloride	mg/l	27.8	1210	12.3	22.7
Cyanide	mg/l	1.5	159	0.004	3.6
Fluoride	mg/l	0.91	0.95	0.62	0.18
Aluminum, Total	mg/l	< 0.5	< 0.5	< 0.5	3.9
Arsenic, Total	mg/l	< 0.001	0.012	< 0.001	0.008
Barium, Total	mg/l	< 0.5	< 0.5	< 0.5	< 0.5
Chromium, Total	mg/l	0.005	0.051	0.004	0.020
Iron, Total	mg/l	16.4	36.8	0.50	17.1
Lead, Total	mg/l	0.003	< 0.001	< 0.001	0.012
Manganese, Total	mg/l	9.4	3.0	1.7	2.3
Mercury, Total	mg/l	< 0.0002	< 0.0002	0.0002	0.0005
Selenium, Total	mg/l	0.005	0.005	0.005	0.008
Silver, Total	mg/l	< 0.001	< 0.001	< 0.001	< 0.001
Sodium, Total	mg/l	29.4	411	54.2	30.8
Nitrate, Nitrogen	mg/l	2.2	< 0.15	15.3	< 0.15
Total Organic Halogens	ug/l	215	78	48	82
Herbicides:					
2,4-D	ug/l	< 0.25	20.6	< 0.25	< 0.25
2,4,5-TP	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Pesticides:					
Endrin	ug/l	< 0.50	< 0.50	< 0.05	< 0.50
Lindane	ug/l	< 0.50	< 0.50	< 0.05	< 0.50
Methoxychlor	ug/l	< 2.5	< 2.5	< 0.25	< 2.5
Toxaphene	ug/l	<25	<25	< 2.5	<25
Phenolics	mg/l	< 0.005	1.19	< 0.005	< 0.005
pH	Standard	6.64	7.15	6.50	6.99
Total Dissolved Solids	mg/l	1120	4920	880	108
Specific Conductance	umhos/cm@25°C	1470	8010	1070	461
Sulfate	mg/l	871	2950	513	111

ER-SWM-87: 9/83

Logged DRH.

9/24/85

Date Prepared

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

0 0 4 2 7 9 0 6

I.D. Number

Hazardous Waste Management

Facility Inspection Checklist for Compliance with Interim Status Standards Covering Ground-Water Monitoring

FORM 4

Facility Name	Phila Coke Co., Inc.	Facility Permit Number	
County	Phila.	Municipality	Phila.
Company Address	4501 Richmond St. Phila., PA 19137	Inspector's Name	Philip Rotstein
Company Contact/Official	James Hogeboom	Branch/Organization	Solid Waste-Facilities
Title	V.P.-Oporations	Date of Inspection	9/18/85

Type of facility: (check appropriately)	Yes	No	Unknown
a) surface impoundment	✓		
b) landfill			
c) land treatment facility			
d) disposal waste pile*			

Ground-Water Monitoring Program

		Yes	No	Unknown
1.	Was the ground-water monitoring program reviewed prior to site visit? If "No",	✓		
	a) Was the ground-water program reviewed at the facility prior to site inspection?			
2.	Has a ground-water monitoring program (capable of determining the facility's impact on the quality of any ground-water system which the facility has the potential to affect, or as otherwise deemed necessary by the Department) been implemented? 75.265(n)(1)	✓		
3.	Has at least one monitoring well been installed hydraulically upgradient from the limit of the waste management area? 75.265(n)(3)(i)	✓		
	a) Are ground-water samples from the upgradient well representative of background ground-water quality and not affected by the facility (as ensured by proper well number, locations, and depths)?	✓		

* Listed separate from landfill for convenience of identification.

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		Yes	No	Unknown
4.	Have at least three monitoring wells been installed hydraulically downgradient at the perimeter of the waste management area? 75.265(n)(3)(ii)	✓★		
	a) Do well number, locations, and depths ensure prompt detection of any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the groundwater?	✓		
	b) Have the locations of the monitoring wells been approved by the Department? 75.265(n)(3)(iii)	✓		
5.	Have the locations of the waste management areas been verified to conform with information in the ground-water program?	✓		
	a) If the facility contains multiple waste management components, is each component adequately monitored?			
6	Do the numbers, locations, and depths of the ground-water monitoring wells agree with the data in the ground-water monitoring system program? (If "No", explain discrepancies on an attachment.)	✓		
7.	Well completion details: 75.265(n)(5) and 75.265(n)(6)			
	a) Are wells properly cased?	✓		
	b) Are wells screened (perforated) and packed where necessary to enable sampling at appropriate depths?	✓		
	c) Are annular spaces properly sealed to prevent contamination of samples and the ground water?	✓		
8	Has a ground-water sampling and analysis plan been developed? 75.265(n)(7)	✓		
	a) Has it been followed?	✓		
	b) Is the plan kept at the facility?		✓★	
	c) Does the plan include procedures and techniques for:			
	1) Sample collection?	✓		
	2) Sample preservation?	✓		
	3) Sample shipment?	✓		
	4) Analytical procedures?	✓		
	5) Chain of custody control?	✓		

★ - see attachment

		Yes	No	Unknown
9.	Are the required parameters in ground-water samples being tested quarterly for the first year? 75.265(n)(8) and 75.265(n)(9)	✓*		
a)	Are the ground-water samples analyzed for the following:			
1)	Parameters characterizing the suitability of the ground-water as a drinking water supply? 75.265(n)(8)(i)	✓*		
2)	Parameters establishing ground-water quality? 75.265(n)(8)(ii)	✓*		
3)	Parameters used as indicators of ground-water contamination? 75.265(n)(8)(iii)	✓*		
(i)	Has provision been made for the establishment of initial background concentrations of all parameters in all monitoring wells quarterly during the first year? 75.265(n)(9)	✓		
(ii)	For each indicator parameter, are at least four replicate measurements obtained at each upgradient well for each sample obtained during the first year of monitoring? 75.265(n)(10)	✓		
(iii)	Are provisions made to calculate the initial background arithmetic mean and variance of the respective parameter concentrations or values obtained from the upgradient well(s) during the first year? 75.265(n)(10)		✓*	
b)	For facilities which have completed first year ground-water sampling and analysis requirements:			
1)	Have samples been obtained and analyzed for the ground-water quality parameters at least semi-annually? 75.265(n)(11)(i)			N.A.
2)	Have samples been obtained and analyzed for the indicators of ground-water contamination at least quarterly? 75.265(n)(11)(ii)			N.A.
c)	Were ground-water surface elevations determined at each monitoring well each time a sample was taken? 75.265(n)(12)	✓		
d)	Were the ground-water surface elevations evaluated at least annually (by January 31) to determine whether the monitoring wells are properly constructed? 75.265(n)(17)			N.A.
e)	If it was determined that modification of the number, location, or depth of monitoring wells was necessary, was the system brought into compliance with 75.265(n)(3)? 75.265(n)(17)			N.A.
f)	Prior to any construction modification, were any proposed changes approved in writing by the Department? 75.265(n)(17)			N.A.

* - See attachment

		Yes	No	Unknown
10.	Has an outline of a ground-water quality assessment and abatement program been prepared? 75.265(n)(13)	✓		
	a) Does it describe a program capable of the following:			
	1) Determining which hazardous waste or hazardous waste constituents have entered the ground water? 75.265(n)(13)(i)	✓		
	2) Determining the rate and extent of migration of hazardous waste or hazardous waste constituents in ground water? 75.265(n)(13)(ii)	✓		
	3) Determining concentrations of hazardous waste or hazardous waste constituents in ground water? 75.265(n)(13)(iii)	✓		
	4) Abating any ground-water contamination attributable to the hazardous waste management facility? 75.265(n)(13)(iv)	✓		
	b) After the first year of monitoring, have at least four replicate measurements of each indicator parameter been obtained for samples taken from each well monitored? 75.265(n)(14)			N.A.
	1) Were the results compared with the initial background means from the upgradient well(s) determined during the first year?			N.A.
	(i) Was each well considered individually?			N.A.
	(ii) Was the Student's t-test used at the appropriate level of significance (see Chapter 75, Subchapter D, Appendix III)?			N.A.
	2) Was a significant increase (or pH decrease as well) found in the:			
	(i) Upgradient wells			N.A.
	(ii) Downgradient wells			N.A.
	If "Yes", Hazardous Waste Management Form 5 must also be completed.			
11.	Have records been kept of the analyses required in paragraphs 75.265(n)(9) through 75.265(n)(11)? 75.265(n)(18)(i)	✓		
12.	Have records been kept of ground-water surface elevations taken at the time of sampling for each well (75.265(n)(12))? 75.265(n)(18)(i)	✓		
13.	Have records been kept of required elevations in indicator parameters (75.265(n)(14))? 75.265(n)(18)(i)		✓ ☆	

		Yes	No	Unknown
14.	Has the following ground-water information been reported to the Department: 75.265(n)(18)(ii)			
(a)(i)	During the first year, initial background concentrations of parameters listed in 75.265(n)(8)(i) within 15 days after completing each quarterly analysis required during the first year?		✓	
(ii)	For each well, have any parameters whose concentrations or values have exceeded the maximum contaminant levels allowed in drinking water supplies been separately identified?	✓		
(b)(i)	Semi-annual measurements of the parameters establishing ground-water quality (75.265(n)(8)(ii)) for each ground-water monitoring well taken at the end of the first (April 1) and third (October 1) quarters?			N.A.
(ii)	Have any significant differences from the initial background found in the wells been separately identified?			N.A.
(iii)	Has this information been submitted as part of the quarterly report (75.265(m)) for those facilities receiving hazardous waste from off-site sources?			N.A.
(c)(i)	Quarterly measurement of the parameters used as indicators of ground-water contamination (75.265(n)(8)(iii)) and the required evaluations of these parameters under 75.265(n)(14)?	✓		
(ii)	Have any significant differences from initial background found in the upgradient wells been separately identified and included in the quarterly submission?			N.A.
(d)(i)	Quarterly results of the evaluation of ground-water surface elevations under 75.265(n)(17)?		✓	
(ii)	If applicable, has a description of the response to that evaluation been included?			

Philadelphia Coke Co., Inc.
PAD 00427906

To date, two rounds of quarterly sampling for the background year have been completed and the the third round is scheduled for early October 1985. The groundwater monitoring program is being conducted in accordance with an approved RCRA groundwater monitoring plan which includes an assessment and abatement outline. Results of the second round of sampling are to be submitted by mid-October 1985 along with a request to confine future testing to select indicator parameters rather than the complete RCRA Series plus a priority pollutant scan as has been the case for the first two rounds. This request will be given

careful consideration upon receipt, although no strict waiver provision exists in PA Hazardous waste regulations. Since closure was supposedly achieved via total removal of all hazardous wastes in the impoundment(s), former plant operators have taken the position that analysis for RCRA parameters for four consecutive quarters is unnecessary and applies only to active facilities. The plant officially closed approx. two years ago and at present, existing structu are being dismanted. The former locations of the impoundments are as clearly visible.

Valid questions remain as to the adequacy of the closure procedures since available records fail to indicate whether testing of underlying soils was conducted

either during or after waste removal to assess the degree of contamination. It was confirmed during a site inspection conducted February 6, 1985 by the former plant engineer, that no such testing was conducted, however, soils in direct contact with ~~the~~ decanter tar sludges were removed. The exact thickness of soils removed was not substantiated. To resolve this matter, I suggest a series of shallow soil borings be driven though the former impoundments to an approximate depth of 2 ft. below base elevation ~~the waste~~, ~~and~~ samples collected at appropriate intervals and analyzed for coal tar related constituents. Two major complications are the shallow nature of the water table and the lack of native soils even at depth. The vast majority of the property is covered with

fill material consisting of demolition debris of various types.

As further justification for some type of soils testing program, initial results from monitoring well No. 2, located along the perimeter of the impoundments, indicate elevated concentrations of phenolic compounds (ppm levels), ~~and~~ benzene and toluene. All are considered coal tar related constituents. This points towards a possible continuing source of contamination, namely the impoundments although other on-site sources may exist. ~~are possible~~. Monitoring well No 2 is by far the most ~~contaminated~~ as compared to ~~the~~ remaining wells which is not unexpected given its location. If incoming analytical data for well No. 2 ~~shows~~ exhibits a consistent

trend in the concentrations of hazardous constituents (phenols) and related compounds, I would see no alternative but to recommend abatement measures in the form of groundwater recovery and treatment. The remediation of any present sources of contamination, such as soils in the impoundments, would also be required.

The Department should withhold approval of closure until matters regarding soils and groundwat contamination are resolved.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III - 6th & Walnut Sts.
Philadelphia, Pa. 19106

SUBJECT: RCRA Inspection - PHILADELPHIA COKE Co. - PHILA, PA. DATE:
PAD 000427906

FROM: Gregory A. Koltonuk, Environmental Scientist
RCRA Enforcement Section (3HW11)

TO: File

Thru: Peter W. Schaul, Chief
RCRA Enforcement Section (3HW11)

BASED UPON A REVIEW OF THE RCRA INSPECTION REPORT FOR THE FACILITY REFERENCED ABOVE, I HAVE DETERMINED THAT NO FURTHER ACTION IS REQUIRED AT THIS TIME.

Maj TSD

HAZARDOUS WASTE INSPECTION REPORT
Generators - Part A

Date of inspection 9/18/85 Time start 1:15 PM Time finish 2:20 PM

Name of inspector Michael M. Bobek

Company, installation name Philadelphia Coke Co.

Location 4501 Richmond St.

County Phila. Municipality Phila

Identification number PAD000427906

Name of responsible official James Hogeboom

Title V.P. of Operations

Mailing address P.O. Box 6561, Mesa, Arizona 85206

Area code and phone no. —

Name of person interviewed Ed Gallagher

Title Security

Mailing address (if different from above) 4501 Richmond St., Phila, PA. 19137

Area code and phone no. —

1. Current waste handling method:

   a. ☐ On-site ☐ treatment, ☐ storage, ☐ disposal

   b. ☐ On-site ☐ use, ☐ reuse, ☐ recycle, ☐ reclaim

   c. ☐ Off-site ☐ treatment, ☐ storage, ☐ disposal

   d. ☐ Off-site ☐ use, ☐ reuse, ☐ recycle, ☐ reclaim

2. Amount of hazardous waste produced:

   a. _____ kg./mo.

   b. _____ kg./yr.

3. Types of hazardous waste produced by Hazardous Waste Number:

   None produced at this time.

4. Are hazardous wastes transported off-site by the generator? ☐ Yes ☑ No

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HAZARDOUS WASTE INSPECTION REPORT
TSD Facilities - Part A

Date of inspection 9/18/85 Time start 1:15 PM Time finish 2:20PM

Name of inspector Michael M. Bobek

Company, installation name Philadelphia Coke Co.

Location 4501 Richmond St.

County Phila. Municipality Phila

Identification number PAD 000427906

Name of responsible official James Hogeboom

Title V.P. Of Operations

Mailing address P.O. Box 6561, Mesa, Arizona 85206

Area code and phone no. —

Name of person interviewed Ed Gallagher

Title Security

Mailing address (if different from above) 4501 Richmond St., Phila, PA 19137

Area code and phone no. —

1. Site characterization:

   a. ☐ Treatment - ☐ surface impoundments, ☐ chemical, ☐ physical, ☐ biolo[illegible]l

   b. ☑ Storage - ☐ containers, ☐ tanks, ☑ surface impoundments, ☐ waste piles

   c. ☐ Disposal - ☐ land treatment, ☐ landfill, ☐ incineration, ☐ thermal treatment

   d. ☐ Use, ☐ reuse, ☐ recycle, ☐ reclaim

2. Does the facility generate hazardous wastes? ☐ Yes ☑ No

3. Types of hazardous waste produced by Hazardous Waste Number:

   None produced at this time

4. Are hazardous wastes transported off-site by the facility? ☐ Yes ☑ No

HAZARDOUS WASTE INSPECTION REPORT
Part C - Comments

Date of Inspection 9/18/85 Identification Number PAD000427906

Company, Installation Name Philadelphia Coke Co.

County Phila Municipality Phila

Workers from demolition of buildings not on site due to Mr. Peter Kupin attempting to renegotiate contract with Mr. Hogeboom before any further demolition takes place.

Groundwater sampling is scheduled for early October 1985.

No violations observed at time of inspection

This inspection report is official notification that a representative of the Department of Environmental Resources, Bureau of Solid Waste Management, inspected the above installation. The findings of this inspection are shown in this report. Any violations which were uncovered during the inspection are indicated. Violations may also be discovered upon examination of the results of laboratory analyses and review of Department records. Notification will be forthcoming, confirming any violations indicated herein and listing any additional violations.

Person Interviewed (signature) _____ Date _____

Inspector (signature) Michael M. Bobek Date 9/18/85

	EVALUATED?	ADEQUATE?	
9. Closure Plan:	9A. ☐ NA ☐ NE Date 4 / 13 / 83 (M / D / Y)	9B. ☑ Yes ☐ No	
10. Closure Cost Estimate:	10A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	10B. ☐ Yes ☐ No	10C. Amount: $_____ UNKNOWN ☐
11. Closure Assurance Instrument(s):	11A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	11B. ☐ Yes ☐ No	
	11C. Instrument type(s): ☐ Trust Fund ☐ Financial Bond ☐ Performance Bond ☐ Letter of Credit ☐ Insurance ☐ Financial Test ☐ Corporate Guarantee ☐ State Guarantee ☐ Other State Mechanism		
12. Post-closure Plan:	12A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	12B. ☐ Yes ☐ No	
13. Post-closure Cost Estimate:	13A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	13B. ☐ Yes ☐ No	13C. Amount: $_____ UNKNOWN ☐
14. Post-closure Assurance Instrument(s):	14A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	14B. ☐ Yes ☐ No	
	14C. Instrument type(s): ☐ Trust Fund ☐ Financial Bond ☐ Performance Bond ☐ Letter of Credit ☐ Insurance ☐ Financial Test ☐ Corporate Guarantee ☐ State Guarantee ☐ Other State Mechanism		
15. Sudden Liability Instrument(s):	15A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	15B. ☐ Yes ☐ No	15C. Amount? $_____ per occurrence $_____ annual aggregate
	15D. Instrument type(s) ☐ Insurance Policy ☐ Financial Test ☐ State Guarantee ☐ Other State Mechanism		
16. Non-sudden Liability Instrument(s):	16A. ☐ NA ☑ NE Date ___/___/___ (M / D / Y)	16B. ☐ Yes ☐ No	16C. Amount? $_____ per occurrence $_____ annual aggregate
	16D. Instrument type(s): ☐ I ance Policy ☐ F cial Test ☐ State Guara ☐ Other State mechanism		

17. Closure Process:	17A. Process begun?		☐ No	Date Begun 6 / 4 / 82 (M D Y)
	17B. In accordance with approved plan and required procedures?	☑ Yes	☐ No	
	17C. Closure certifications received?		☑ No	Date Received / / (M D Y)
	17D. Facility released from closure assurance and liability requirements?	☐ NA	☑ No	Date Released / / (M D Y)
18. Post-Closure Process:	18A. Process begun?		☑ No	Date Begun / / (M D Y)
	18B In accordance with approved plan and required procedures?	☐ Yes	☐ No	
	18C. Survey plat/record of wastes received?		☐ No	Date Received / / (M D Y)
	18D. Post-closure period completed?		☐ No	Date Completed / / (M D Y)
	18E. Facility released from post-closure assurance requirements?	☐ NA	☐ No	Date Released / / (M D Y)
19. Permit Application:	19A. Called In?		☐ No	Date Called 4 / 28 / 83 (M D Y)
	19B. Reason for permit application call-in: ☐ Groundwater ☐ Financial Assurance ☐ Closure ☐ Liability Coverage ☑ Other: Permit Req'd			
20. Comments:				

5120 Butler Pike
Plymouth Meeting
Pennsylvania 19462
215-825-3000
Telex 846-343

Woodward-Clyde Consultants

DER-RECEIVED
NORRISTOWN
JUL 22 1985

July 16, 1985
84C2145

Mr. Philip H. Rotstein
Hydrogeologist
Pennsylvania Department of
Environmental Resources
Bureau of Solid Waste Management
1875 New Hope Street
Norristown, PA 19401

Dear Mr. Rotstein:

Enclosed is a copy of Woodward-Clyde Consultants' report on the hydrogeologic investigation of the Philadelphia Coke Plant in Philadelphia, PA, submitted by WCC on behalf of Philadelphia Coke, Inc. This report documents WCC's field investigation and presents the analytical results from the first round of groundwater samples.

Note that the second quarter sampling has taken place during the beginning of July, 1985, and we are currently awaiting the analytical results. A report of these data will be forthcoming when available.

Please call if you have any questions or comments.

Very truly yours,

WOODWARD-CLYDE CONSULTANTS

Peter R. Jacobson

Peter R. Jacobson
Project Geologist

PRJ/plw

cc: J. Hogeboom
C. Kufts
T. Taylor

DER-RECEIVED
NORRISTOWN

JUL 22 1985

HYDROGEOLOGICAL ASSESSMENT
PHILADELPHIA COKE PLANT SITE
PHILADELPHIA, PENNSYLVANIA

Submitted to:

PHILADELPHIA COKE COMPANY, INC.

Prepared by:

WOODWARD-CLYDE CONSULTANTS
Plymouth Meeting, Pennsylvania

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INTRODUCTION

Since the early 1900's, the Philadelphia Coke Plant, located along the Delaware River and Orthodox Street, Philadelphia, Pennsylvania (Plate 1), has been a coal processing facility, where coal by-products and derivatives have been produced. Plate 2 illustrates the general layout of the plant site facilities and locations where certain products were produced and stored. The plant site is presently being decommissioned. Due to the nature of the storage facilities (tanks, lagoons, pits), and the potentially hazardous nature of the stored products, the potential for some of these products to escape into the groundwater and migrate offsite exists and must be examined as part of the site closure procedures.

The closure of the Philadelphia Coke Plant site is being conducted in accordance with Hazardous Waste Regulations promulgated by the Pennsylvania Department of Environmental Resources (PADER). The scope and procedures of the groundwater monitoring program described in this report have been approved by the PADER.

SUBSURFACE CONDITIONS

MONITORING WELL INSTALLATION

Four monitoring wells were installed to investigate the subsurface conditions and the groundwater quality at the Philadelphia Coke Plant site. The locations of the four monitoring wells are presented on Plate 2. These locations were chosen according to areas of the site which had high potentials for contamination and areas which were expected to be hydrologically upgradient and downgradient of potential contaminant sources.

The monitoring wells were installed by 12-inch O.D. hollow-stem auger techniques during the week of March 25, 1985. Continuous split-spoon samples of the soils were taken for inspection and geologic classification. Head-space analyses of the soils

were obtained using a Century Organic Vapor Analyzer (OVA) Model 128. The boring logs of the monitoring well installation program are included as Appendix A.

Once drilling had been advanced to the desired depth for each hole, the monitoring well was emplaced. The borehole was advanced to a depth that would allow for the top of a 10-foot well screen to remain 1 to 2 feet above the highest estimate of the water table elevation. In the case of Well W-4, however, this objective could not be accomplished due to the relatively depressed level of the water table and the need to keep the bottom of the well above a confining clay layer.

The monitoring wells were constructed of 4-inch I.D. PVC pipe with a 10-foot screen length. A well cap was emplaced on the bottom of the screen to prevent sediment inflow to the well. A sand pack was placed in the annulus around each well screen, as well as 1 to 2 feet above and below the screen. The well was then sealed above the sand pack with approximately 1 foot of bentonite pellets. A cement grout was then placed above the seal to the surface. A 6-inch-diameter steel locking protective pipe was then securely emplaced into the cement grout around the PVC riser pipe. The design specifications of the monitoring wells are presented in Table 1. Plate 3 illustrates the typical monitoring well design. Appendix B contains the completed geometries for each well.

During the drilling of each monitoring well, strict protocols were observed to ensure the construction of a "clean" well and to prevent cross-contamination. These protocols included decontamination of all downhole drilling equipment between wells by steam-cleaning and the construction of the well in a clean area.

After emplacement of the well, each well was developed to remove fine-grained sediments from the well. The wells were developed using an air compressor and hose. Wells W-1 and W-3 were developed for approximately 1 hour, until clean. Wells W-2 and W-4 recovered very slowly and, thus, only two well volumes could be pumped. A 2-week period was then required between development and sampling to allow the aquifer to equilibrate and stabilize.

GEOLOGY

The Philadelphia Coke Plant site lies on a wedge of unconsolidated Atlantic Coastal Plain sediments adjacent to the western shore of the Delaware River (Plate 1). These sediments overlie crystalline bedrock.

The sediments at the plant site consist of recent alluvial floodplain and channel deposits, which are overlain by a man-made fill material. The uppermost natural deposit encountered in Wells W-1 and W-4 is generally a brown to gray, fine to coarse sand containing clay, silt, and gravel. This sand has probably been removed by plant activities in the areas of Wells W-2 and W-3. Above this recent sand deposit lies 6 to 10 feet of fill material, containing fine to coarse sand, brick fragments, coal, and cinder, which was encountered in all four monitoring wells. Below the sand and fill layers is a sequence of very soft, silty clays deposited by the Delaware River.

The boreholes for the monitoring wells were advanced 2 to 7 feet into this clay unit and then terminated. The clay layer acts as a lower confining unit to groundwater in the overlying recent deposits and was, therefore, not penetrated. The upper two stratigraphic units, the fill and recent sands, comprise the water table aquifer into which the monitoring wells were installed and screened. This aquifer ranges from a thickness of 7 feet in Well W-3 to a thickness of almost 15 feet in Well W-4. For detailed descriptions of the soils, refer to the boring logs in Appendix A.

GROUNDWATER CHARACTERISTICS

The four monitoring wells were installed to provide information concerning both the groundwater flow regime of the water table aquifer and its groundwater quality.

GROUNDWATER FLOW REGIME

Groundwater levels were measured in each of the wells prior to sampling on April 8, 1985. A second round of measurements was obtained later in the day to

determine if there are any significant tidal effects from the Delaware River. The measured levels of the water table were then converted to mean sea level elevations, based on the surveyed elevations of the wells presented in Table 1. The elevations of the water table are presented in Table 2. From the groundwater elevations, the direction of groundwater flow can be determined by contouring the potentiometric surface (Plate 4).

Plate 4 illustrates that the groundwater at the plant site flows radially outward from a central high located at Well W-2. A relatively steep hydraulic gradient exists between Wells W-2 and W-4, with approximately 1 foot of head change per 107 feet horizontal distance; whereas, the gradient towards the Delaware River between Well W-2 and Wells W-1 and W-3 is shallower, with approximately 1 foot per 300 feet and 1 foot per 500 feet, respectively.

This radial pattern outward from the center of the plant site was not the expected pattern. With the Delaware River being a natural point of groundwater discharge, located adjacent to the plant site, it would be expected that the groundwater flow would be toward the river from Well W-4 to W-1. Several possibilities exist which may be producing the observed groundwater flow pattern. An unknown hydraulic sink, such as a large, nearby city sewer line or other underground channelway, may be present, controlling the groundwater flow in the northwest area of the plant site. Other possibilities include (1) an excessive amount of groundwater recharge in the area of W-2 as a result of the porous nature of the soils, as opposed to the paved areas surrounding the site, or (2) the presence of deep foundations or other hydraulic barriers affecting groundwater flow.

Tidal effects from the Delaware River appear to be minimal. Two water level measurements from each well were obtained 3 to 4 hours apart, with essentially no measurable change in head (Table 2).

GROUNDWATER QUALITY

To assess the groundwater quality at the Philadelphia Coke Plant, the first round of samples was collected from the four monitoring wells on April 8, 1985.

These samples were collected by a team of WCC geologists and analyzed by RMC Environmental Services, Pottstown, Pennsylvania for the parameters listed in Table 3. Standard methodologies approved by the U.S. Environmental Protection Agency (USEPA) and PADER for groundwater analyses were used.

SAMPLE COLLECTION

Prior to sample collection, each well was purged of approximately three well volumes to ensure the collection of a representative groundwater sample. Purging was accomplished using a stainless steel bailer. After purging, the groundwater sample was also collected with a stainless steel bailer. Once the samples were obtained, they were placed on ice and kept cool until received by a lab courier. The samples for metals were filtered with a 0.45-micron filter before being placed in an acidified sample bottle. All equipment used during purging and sampling was steam-cleaned between wells to prevent cross-contamination.

ANALYTICAL RESULTS

The results of the chemical analyses are summarized in Table 4. This table lists only those parameters that were detected in any of the wells. For a complete listing of all the compounds that were analyzed, the raw data from the laboratory has been included as Appendix C.

Only nine priority pollutant organic compounds were detected in the wells at the plant site (Table 4). No priority pollutant compounds were detected in Well W-1. Only methylene chloride (a possible laboratory contaminant) and bis (2-ethylhexyl) phthalate (a constituent of PVC well pipe) were detected in low concentrations in Wells W-3 and W-4. As expected, Well W-2, located near old lagoons in the center of the plant site, contained a relatively high concentration of acid-extractable compounds, particularly phenol at 2,710 parts per billion (ppb) and 2,4-dimethylphenol at 27,600 ppb. Other than methylene chloride, volatile organic compounds detected in Well W-2 include benzene (143 ppb), toluene (60 ppb), and ethylbenzene (3.0 ppb). Base/neutral compounds

detected in Well W-2 include nitrobenzene (90 ppb) and bis (2-chloroethoxy) methane (15 ppb).

The acid compounds found in Well W-2, phenol and 2,4-dimethyl phenol, are characteristic compounds derived from the processing of coal tar and are, therefore, not unexpected contaminants for this plant site. The volatile compounds of benzene and toluene are also expected at coal processing facilities, since they are derivatives of coal-tar distillation. Ethylbenzene and the base/neutral bis (2-chloroethoxy) methane may have been used as industrial solvents at the plant site. Nitrobenzene may have been produced by treating benzene with acids.

The analytical results for the water quality parameters are listed in Table 5. Well W-2 is the most contaminated well, again showing elevated concentrations of several parameters, including chemical oxygen demand (COD), chloride, cyanide, iron, manganese, sodium, total organic halogens (TOX), 2,4-D, total dissolved solids, and sulfate. Little confidence should be placed in the high TOX value as a water quality parameter, because the concentration of organic halogens was very low in the priority pollutant analyses. Only methylene chloride was detected in very low concentrations in the priority pollutant organic analyses. This difference may be a result of: (1) the presence of non-priority pollutant organic halogens, or (2) the TOX parameter is not a good indicator of the true concentration of organic halogens.

Overall, little contamination was found in the group of Appendix II parameters, including pesticides (Table 3), with the exceptions of coliform in Wells W-2 and W-4, and 2,4-D in Well W-2.

GROUNDWATER QUALITY STANDARDS

To evaluate the groundwater quality at the Philadelphia Coke Plant site, the analytical results are compared to the EPA standards for the Maximum Contaminant Levels (MCL) in Drinking Water (Table 6). Where MCLs do not exist, informal standards,

such as Suggested No-Action Response Levels (SNARL) or Ambient Water Quality Criteria, are used for comparison purposes.

From the first round of water quality analyses, presented in Table 5, only the following water quality parameters were detected in amounts greater than the MCLs: chloride and chromium in Well W-2, iron and manganese in all wells, nitrate in Well W-3, and total dissolved solids in Wells W-1, W-2, and W-3.

2,4-dimethylphenol in Well W-2 was the only priority pollutant compound detected in excess of its respective criterion, and may present an environmental concern. Benzene, although it was detected below the recommended guideline in W-2, may be of concern since it is a known carcinogen.

CONCLUSIONS

From the first round of groundwater levels and groundwater quality discussed in this report, it is evident that the Philadelphia Coke Plant site is not presenting a threat to groundwater contamination in the surrounding environment. Only one monitoring well, W-2, which is centrally located, contained appreciable amounts of priority pollutant organic compounds, plus some metals and cyanide. Most of the compounds detected in this well are related to coal processing operations. The perimeter wells, W-1, W-3, and W-4, contain essentially no priority pollutant contamination attributable to the site. This indicates that, although the groundwater flow is radially outward from W-2, the contamination in W-2 represents a localized situation and contaminants are not being transported offsite.

The only organic compounds detected which may be of environmental significance are 2,4-dimethylphenol and possibly benzene. 2,4-dimethylphenol is two orders of magnitude in excess of the recommended guideline for drinking water, and the presence of benzene may be construed as a health risk as a carcinogen, even though the local groundwater is not used as a source of drinking water or industrial water supply.

RECOMMENDATIONS

The work remaining to be completed for this hydrogeologic assessment of the Philadelphia Coke Plant site includes the collection and analysis of three additional quarterly rounds of groundwater sampling. Continued sampling is warranted to verify the contaminant levels discussed in this report. The next round of samples will be scheduled for early July 1985. After the second round of analyses has been received, recommendations of chemical parameters that can be omitted from future sampling will be presented.

Tables

TABLE 1

WELL DESIGN SPECIFICATIONS AND BOREHOLE GEOMETRIES[1]

Well	Ground Elevation[2]	Top of Casing (PVC) Elevation[2]	Hole Depth (ft)	Screen Length (ft)	Screen Interval Depth	Depth to Clay
W-1	8.7	10.94	14	10	3-13	9
W-2	13.4	15.31	14	10	3-13	10
W-3	11.5	14.46	14	10	3-13	7
W-4	13.2	15.17	16	10	4-14	14

[1] All measurements in feet

[2] Mean Sea Level datum

TABLE 2

GROUNDWATER ELEVATIONS[1]
APRIL 8, 1985

Well	Water Elevation	Time (a.m.)	Water Elevation	Time (p.m.)
W-1	5.84	10:24	5.82	1:27
W-2	8.83	10:33	8.84	2:45
W-3	7.80	10:29	7.77	2:10
W-4	1.69	10:20	—	

Note: Low tide at 11:00 a.m.

[1]All measurements in feet above mean sea level.

TABLE 3

CHEMICAL PARAMETERS ANALYZED
FIRST QUARTER SAMPLING
APRIL 8, 1985

ORGANIC COMPOUNDS

- Volatile Organic Compounds
- Base/Neutral Compounds
- Acid-Extractable Compounds

PARAMETERS ESTABLISHING GROUNDWATER QUALITY

Chlorides	Phenols
Iron	Sodium
Manganese	Sulfates

PARAMETERS USED AS INDICATORS OF GROUNDWATER CONTAMINATION

- pH
- TOC (Total Organic Carbon)
- Specific Conductance
- TOX (Total Organic Halogen)

APPENDIX II PARAMETERS

Arsenic	Mercury	Endrin
Barium	Nitrate	Lindane
Chromium	Selenium	Methoxychlor
Fluoride	Silver	Toxaphene
Lead	Coliform Bacteria	2,4-D
2,4,5-TP		

ADDITIONAL INORGANIC PARAMETERS

Alkalinity	Total Dissolved Solids
Aluminum	BOD
Ammonia as N	COD
Cyanide	

TABLE 4

SUMMARY OF PRIORITY POLLULTANT ORGANIC COMPOUNDS DETECTED[1]
FIRST QUARTER SAMPLING
APRIL 8, 1985

Well	W-1	W-2	W-3	W-4	Field Blank	Detection Limit
Acid Compounds						
Phenol	ND	2,710	ND	ND	ND	10
2,4-dimethylphenol	ND	27,600	ND	ND	ND	10
Volatile Compounds						
Methylene Chloride	ND	6.2	3.8	3.4	ND	1.0
Benzene	ND	143	ND	ND	ND	1.0
Toluene	ND	60	ND	ND	ND	0.2
Ethylbenzene	ND	3.0	ND	ND	ND	1.0
Base/Neutral Compounds						
Nitrobenzene	ND	90	ND	ND	ND	5
Bis (2-chloroethoxy) methane	ND	15	ND	ND	ND	5
Bis (2-ethylhexyl) phthalate	BMDL	ND	12	8.5	17	5

[1] Results in parts per billion (ppb)

BMDL = Below Minimum Detection Limit
ND = Not detected

TABLE 5

SUMMARY OF WATER QUALITY PARAMETERS
APRIL 8, 1985 SAMPLING ROUND

Parameter	Units	W-1	W-2	W-3	W-4
Alkalinity, Total	mg/l	73.1	1040	65.5	89.8
Ammonia, Nitrogen	mg/l	56	917	14.3	20.7
Total Coliform	Colonies/100 ml	100	1800	400	2000
Biochemical Oxygen Demand	mg/l	6.6	220	2.4	37
Total Organic Carbon	mg/l	8.7	5.6	6.7	130
Chemical Oxygen Demand	mg/l	48	1170	12.7	44
Chloride	mg/l	27.8	1210	12.3	22.7
Cyanide	mg/l	1.5	159	0.004	3.6
Fluoride	mg/l	0.91	0.95	0.62	0.18
Aluminum, Total	mg/l	< 0.5	< 0.5	< 0.5	3.9
Arsenic, Total	mg/l	< 0.001	0.012	< 0.001	0.008
Barium, Total	mg/l	< 0.5	< 0.5	< 0.5	< 0.5
Chromium, Total	mg/l	0.005	0.051	0.004	0.020
Iron, Total	mg/l	16.4	36.8	0.50	17.1
Lead, Total	mg/l	0.003	< 0.001	< 0.001	0.012
Manganese, Total	mg/l	9.4	3.0	1.7	2.3
Mercury, Total	mg/l	< 0.0002	< 0.0002	0.0002	0.0005
Selenium, Total	mg/l	0.005	0.005	0.005	0.008
Silver, Total	mg/l	< 0.001	< 0.001	< 0.001	< 0.001
Sodium, Total	mg/l	29.4	411	54.2	30.8
Nitrate, Nitrogen	mg/l	2.2	< 0.15	15.3	< 0.15
Total Organic Halogens	ug/l	215	78	48	82
Herbicides:					
2,4-D	ug/l	< 0.25	20.6	< 0.25	< 0.25
2,4,5-TP	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Pesticides:					
Endrin	ug/l	< 0.50	< 0.50	< 0.05	< 0.50
Lindane	ug/l	< 0.50	< 0.50	< 0.05	< 0.50
Methoxychlor	ug/l	< 2.5	< 2.5	< 0.25	< 2.5
Toxaphene	ug/l	<25	<25	< 2.5	<25
Phenolics	mg/l	< 0.005	1.19	< 0.005	< 0.005
pH	Standard	6.64	7.15	6.50	6.99
Total Dissolved Solids	mg/l	1120	4920	880	108
Specific Conductance	umhos/cm@25°C	1470	8010	1070	461
Sulfate	mg/l	871	2950	513	111

TABLE 6

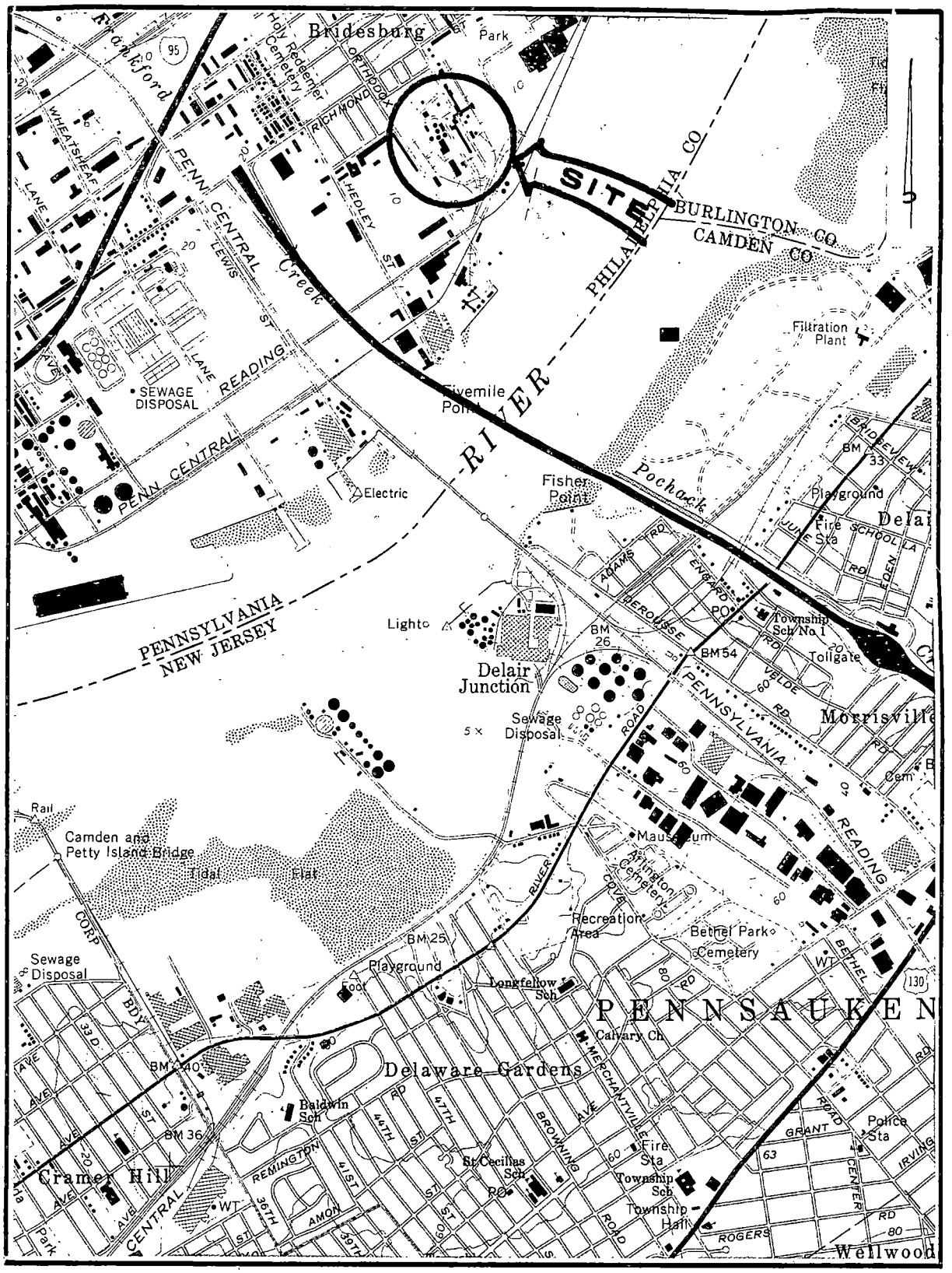
STANDARDS AND GUIDELINES FOR SELECTED COMPOUNDS FOR DRINKING WATER

Parameter	Concentration[1]
PRIMARY AND SECONDARY STANDARDS	
Chloride	250
Fluoride	1.6
Arsenic	0.05
Barium	1.0
Chromium	0.05
Iron	0.3
Lead	0.05
Manganese	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Nitrate	10
2,4-D	0.1
2,4,5-TP	0.01
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
pH	6.5-8.5 (Standard)
Phenol	3,500 ug/l[2]
RECOMMENDED GUIDELINES	
2,4-dimethylphenol	400 ug/l
Benzene	350 ug/l
Toluene	143,000 ug/l
Nitrobenzene	19,800 ug/l
Bis (2-chloroethoxy) methane	No standard limit

[1] mg/l (parts per million) unless otherwise noted

[2] ug/l = parts per billion

Plates

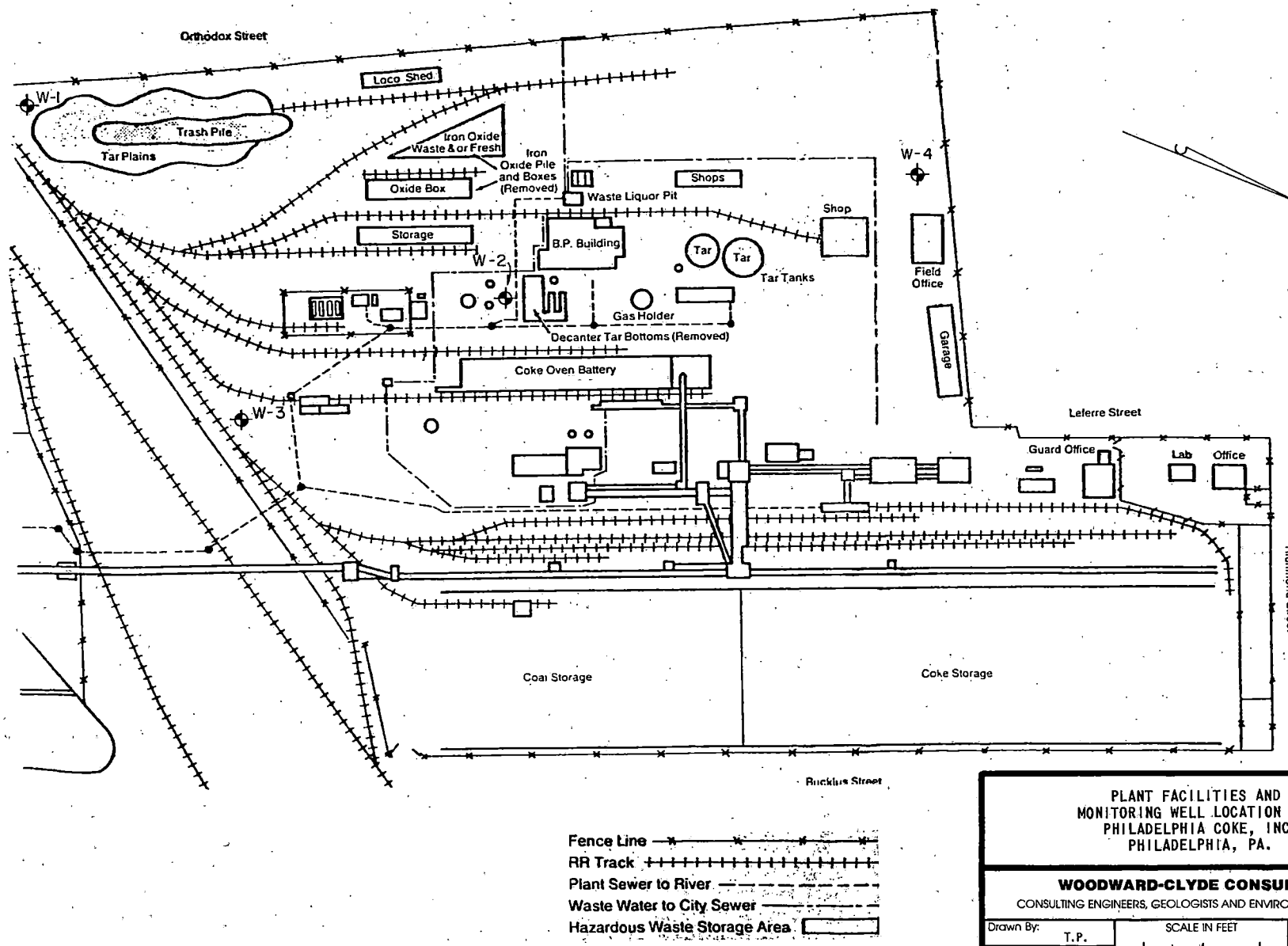


1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

REGIONAL LOCATION PLAN

PLATE 1

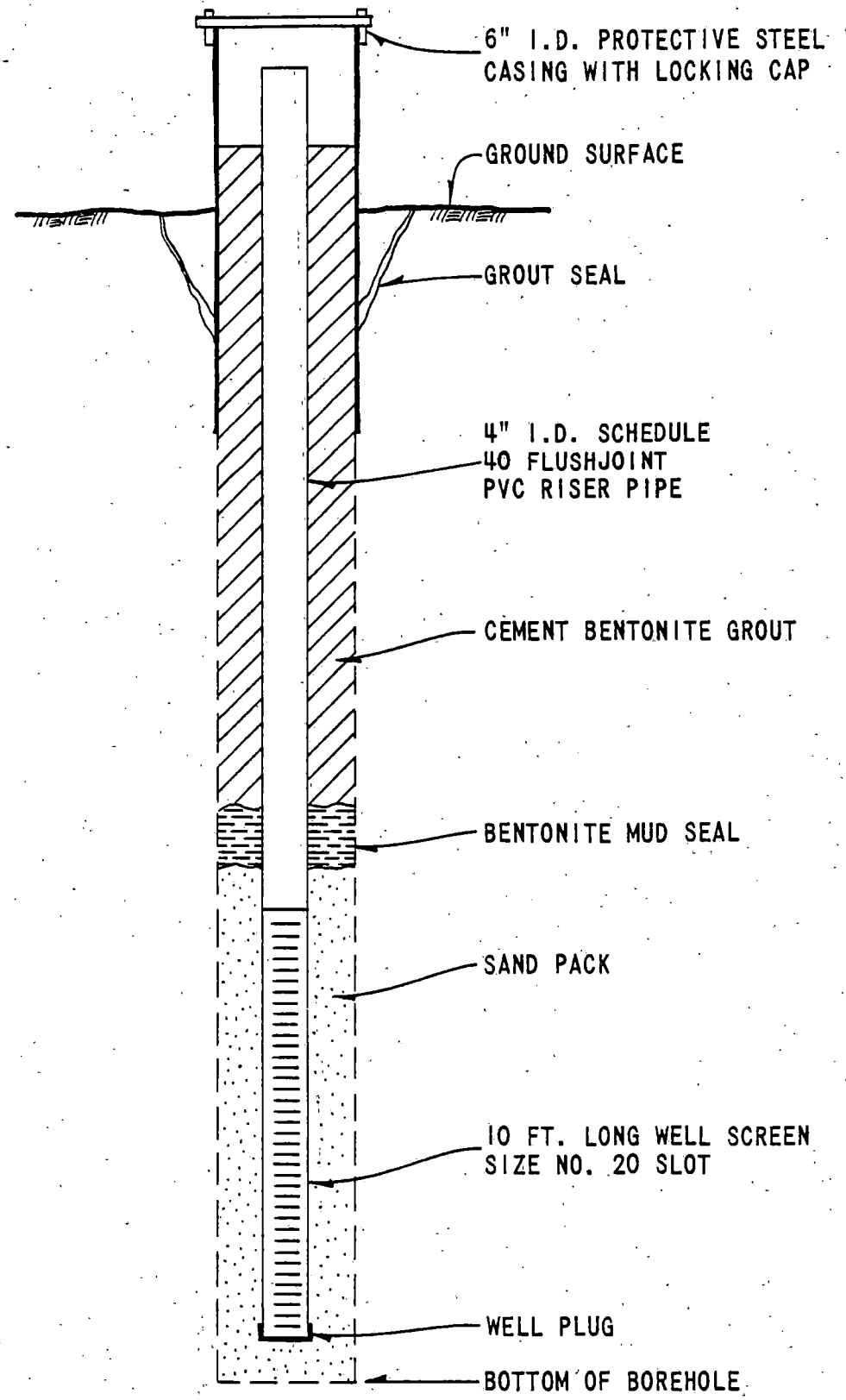


PLANT FACILITIES AND
MONITORING WELL LOCATION PLAN
PHILADELPHIA COKE, INC.
PHILADELPHIA, PA.

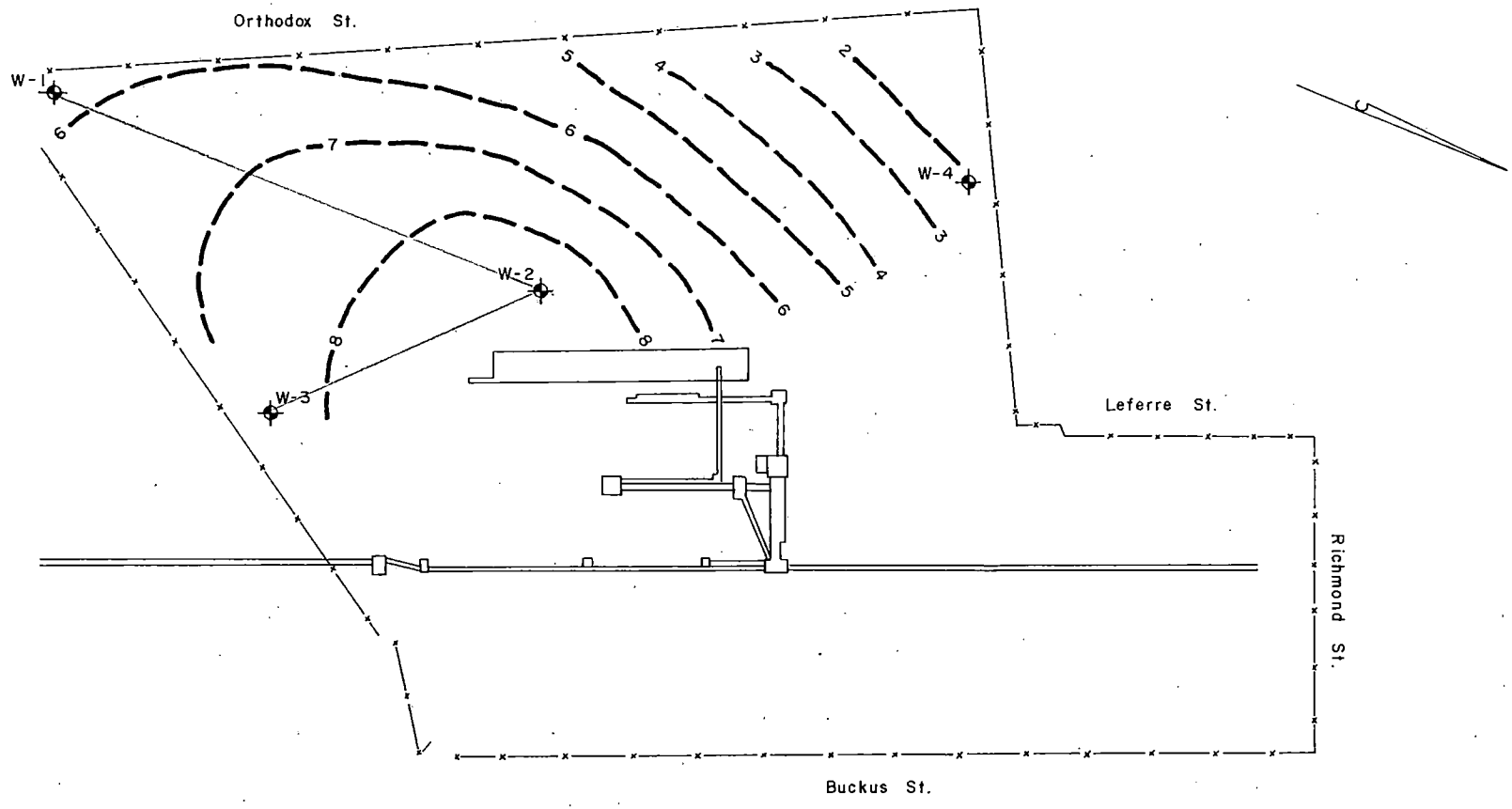
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: T.P.	SCALE IN FEET		Date: 3/4/85
Checked: T.W.T.	0	100 200	Job: 84C2145

PLATE 2



TYPICAL MONITORING WELL CONSTRUCTION
PHILADELPHIA COKE, INC.
PHILADELPHIA, PA



LEGEND:

6 GROUNDWATER CONTOUR

FENCE LINE

GROUNDWATER ELEVATIONS, APRIL 8, 1985
PHILADELPHIA COKE, INC.
PHILADELPHIA, PA.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: T.P.	SCALE IN FEET		Date: 6/5/85
Checked: T.W.T.	0	200	Job: 84C2145

PLATE 4

Appendix A

LOG of BORING No. W-1

DATE 3/25/85 SURFACE ELEVATION 8.7 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS SOILS PPM
0		15						2
		28	Black Fill. Brick, cinders, coal, medium to coarse sand, trace wood					10
5		8		2.2				ND
		6	Dark black to gray, medium to fine sand	-0.3				<1
		4						58
10		3	Very soft, gray to black clay, some silt, trace peat					290
		5		-5.3				570
15								
20								

Completion Depth 14 Feet Water Depth 3.5 Feet Date 3/25/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

WCC-HF 1

LOG of BORING No. W-2

DATE 3/26/85 SURFACE ELEVATION 13.4 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER PPM TESTS SOILS
0		30						80
		17						20
5		13	Black Fill. Brick, cinders, and coal. Trace fine gravel. Bad odor					100
		14						ND
		3		3.4				ND
10		1	Very soft, black clay, trace silt. Bad odor					40
		WOH		-0.6				60
15								
20								

Completion Depth 14 Feet Water Depth 2.5-3 Feet Date 3/26/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

LOG of BORING No. W-3

DATE 3/26/85 SURFACE ELEVATION 11.5 Feet LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER PPM TESTS SOILS
0		7						ND
		4	Black Fill. Coal, slag, very loose					ND
5		2						<1
				4.5				
		2						ND
			Very soft, black clay, trace silt, mica,					18
		4	and peat. Bad odor					880
10		2						>1000
			Very soft, gray to black, clayey silt,					
		2	trace mica	-2.5				220
15								
20								

Completion Depth 14 Feet Water Depth 3.5 Feet Date 3/26/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

LOG of BORING No. W-4

DATE 3/25/85 SURFACE ELEVATION 13.2 Feet LOCATION See Plate 2

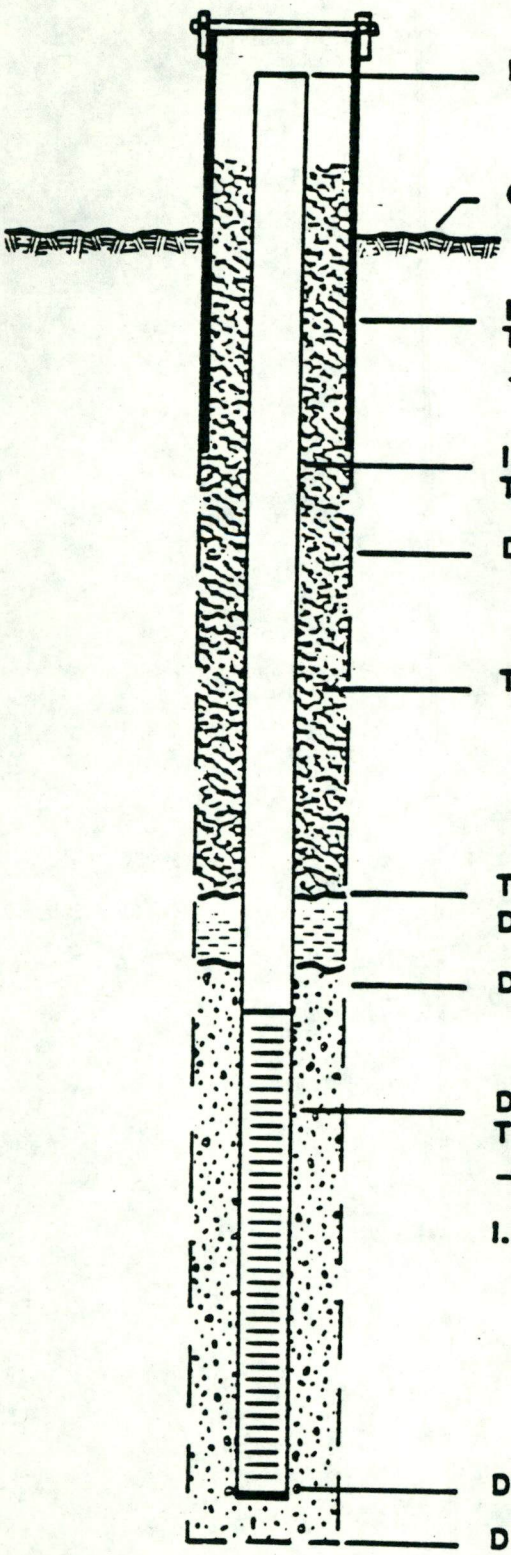
DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER PPM TESTS SOILS
0		19	Brown to black, medium to fine sand, trace coarse sand, cement. (Fill) Trace clay at 2.5'					<1
		13						ND
5		14	Small coal pocket at 5.5'					ND <1
		3		4.2				350
		5	Very soft, brown clay, trace sand, trace peat and shells	2.2				520
10		21						520 680
		13	Dark gray, medium sand, some gravel and clay	-1.3				220
15		9	Soft brown clay, trace sand	-2.8				160
20								

Completion Depth 16 Feet Water Depth 6 Feet Date 3/25/85

Project Name Philadelphia Coke Plant, Philadelphia, PA Project Number 84C2145

Woodward-Clyde Consultants

Appendix B



Elevation of top of riser pipe 10.94'

Ground Elevation 8.7'

I.D. of surface casing 6"
Type of surface casing Steel
with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill cement

Type of seal Bentonite Pellets
Depth to top of seal 1.0'

Depth to top of sand pack 2.0'

Depth to top of screen 3.0'
Type of screened section
SCH 40 20 slot PVC

I.D. of screened section 4"

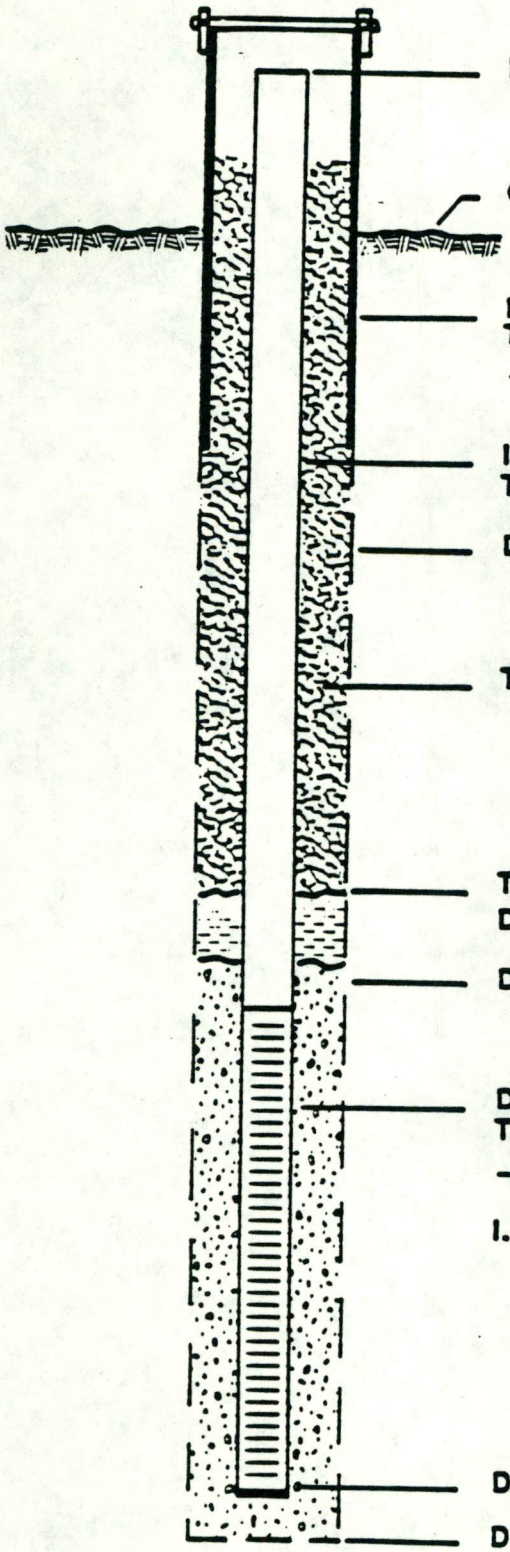
Depth to bottom of well 13.0'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-1

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/25/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 15.31'

Ground Elevation 13.4'

I.D. of surface casing 6"
Type of surface casing Steel
with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 1.0'

Depth to top of sand pack 2.0'

Depth to top of screen 3.0'
Type of screened section
SCH 40 20 slot PVC

I.D. of screened section 4"

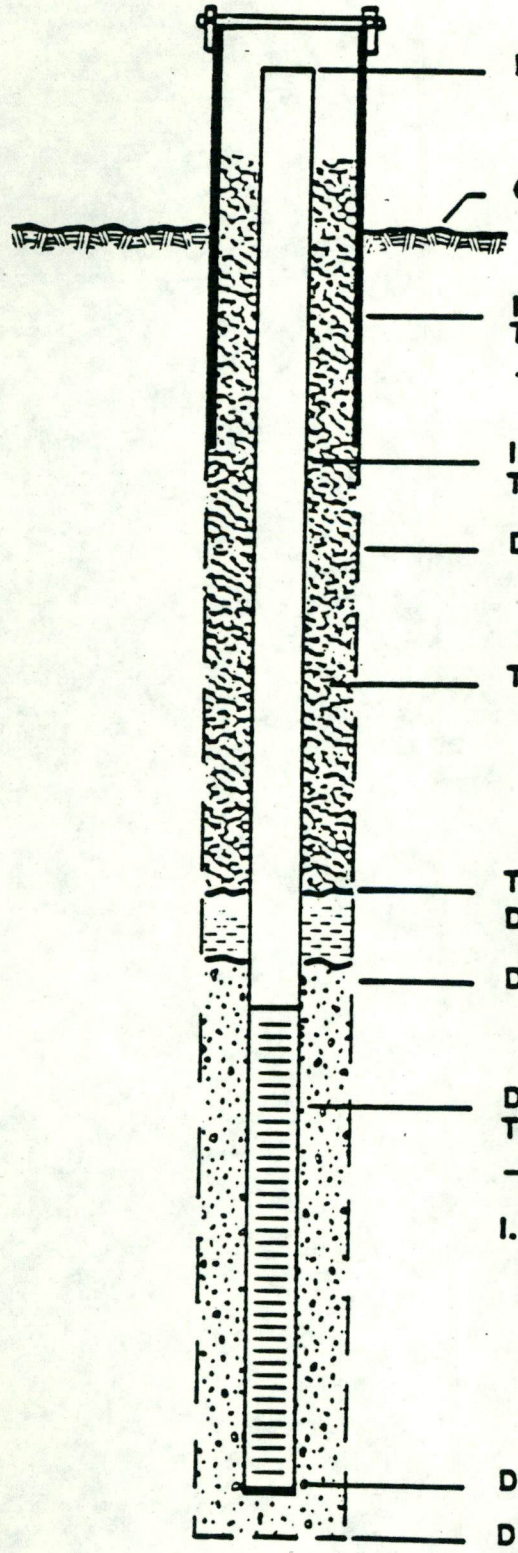
Depth to bottom of well 13.0'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-2

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/26/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 14.46'

Ground Elevation 11.5'

I.D. of surface casing 6"
Type of surface casing Steel
with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 1.0'

Depth to top of sand pack 2.0'

Depth to top of screen 2.5'
Type of screened section
SCH 40 20 slot PVC

I.D. of screened section 4"

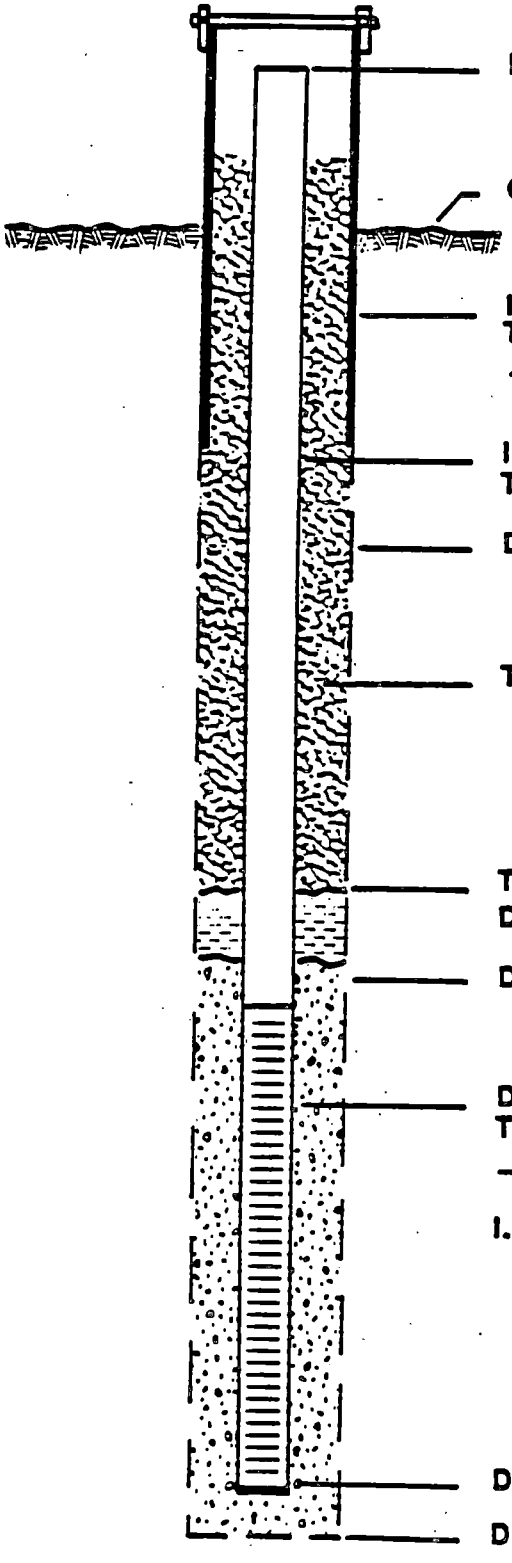
Depth to bottom of well 12.5'

Depth of borehole 14.0'

REPORT OF MONITORING WELL W-3

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/26/85	FIGURE NO:

Woodward-Clyde Consultants



Elevation of top of riser pipe 15.17'

Ground Elevation 13.2'

I.D. of surface casing 6"
Type of surface casing Steel with locking cap

I.D. of riser pipe 4"
Type of riser pipe PVC

Diameter of borehole 12"

Type of backfill Cement

Type of seal Bentonite Pellets
Depth to top of seal 2.0'

Depth to top of sand pack 3.0'

Depth to top of screen 4.0'
Type of screened section SCH 40 20 slot PVC

I.D. of screened section 4"

Depth to bottom of well 14.0'

Depth of borehole 16.0'

REPORT OF MONITORING WELL W-4

DRAWN BY: TWT	CHECKED BY: PRJ	PROJECT NO: 84C2145	DATE: 3/25/85	FIGURE NO:

Woodward-Clyde Consultants

Appendix C

RMC ENVIRONMENTAL SERVICES
Environmental Chemistry Laboratory, Fricks Lock Rd., RD # 1, Pottstown, PA 19464 (215) 326-9662

CERTIFICATE OF ANALYSIS

LABORATORY NO: See Below **RECEIVED:** 10 April 1985 **REPORTED:** 14 May 1985

CLIENT: Woodward-Clyde
5120 Butler Pike
Plymouth Meeting, PA 19462

SAMPLE DESCRIPTION:

UP-Gradient

Parameter	Units	Field Blank RMC# 769-85	W-1 RMC# 770-85	W-2 RMC# 771-85	W-3 RMC# 772-85	W-4 RMC# 773-85
Alkalinity, Total	mg/l	5.1	73.1	1040	65.5	89.8
Ammonia, Nitrogen	mg/l	<0.02	56	917	14.3	20.7
Total Coliform	Colonies/100 ml	<1	100	1800	400	2000
Biochemical Oxygen Demand	mg/l	0.5	6.6	220	2.4	37
Total Organic Carbon	mg/l	0.6	8.7	5.6	6.7	130
Chemical Oxygen Demand	mg/l	8.4	48	1170	12.7	44
Chloride	mg/l	<3.0	27.8	1210	12.3	22.7
Cyanide	mg/l	<0.001	1.5	159	0.004	3.6
Fluoride	mg/l	<0.05	0.91	0.95	0.62	0.18
Aluminum, Total	mg/l	<0.5	<0.5	<0.5	<0.5	3.9
Arsenic, Total	mg/l	<0.001	<0.001	0.012	<0.001	0.008
Barium, Total	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
[illegible]mium, Total	mg/l	0.004	0.005	0.051	0.004	0.020
[illegible], Total	mg/l	<0.05	16.4	36.8	0.50	17.1
Lead, Total	mg/l	0.009	0.003	<0.001	<0.001	0.012
Manganese, Total	mg/l	<0.05	9.4	3.0	1.7	2.3
Mercury, Total	mg/l	<0.0002	<0.0002	<0.0002	0.0002	0.0005
Selenium, Total	mg/l	0.003	0.005	0.005	0.005	0.008
Silver, Total	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium, Total	mg/l	<0.2	29.4	411	54.2	30.8
Nitrate, Nitrogen	mg/l	<0.15	2.2	<0.15	15.3	<0.15
Total Organic Halogens	µg/l	26	215	78	48	82
Herbicides:						
2,4-D	µg/l	<0.25	<0.25	20.6	<0.25	<0.25
2,4,5-TP	µg/l	<0.25	<0.25	<0.25	<0.25	<0.25
Pesticides:						
Endrin	µg/l	<0.05	<0.50	<0.50	<0.05	<0.50
Lindane	µg/l	<0.05	<0.50	<0.50	<0.05	<0.50
Methoxychlor	µg/l	<0.25	<2.5	<2.5	<0.25	<2.5
Toxaphene	µg/l	<2.5	<25	<25	<2.5	<25

Parameter	Units	Field Blank RMC# 769-85	W-1 RMC# 770-85	W-2 RMC# 771-85	W-3 RMC# 772-85	W-4 RMC# 773-85
Acid Extractables	*	*	*	*	*	*
Base/Neutral Extractables	*	*	*	*	*	*
Volatile Organics	*	*	*	*	*	*
Phenolics	mg/l	<0.005	<0.005	1.19	<0.005	<0.005
pH	Standard	6.67	6.64	7.15	6.50	6.99
Total Dissolved Solids	mg/l	<1	1120	4920	880	108
Specific Conductance	µmhos/cm@25°C	32.5	1470	8010	1070	461
fate	mg/l	4.2	871	2950	513	111

*See Attachments

Approved by: Richard S. Rodgers

Richard S. Rodgers, Manager
Environmental Chemistry Laboratory

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	Field Blank	DATE ANALYZED	5/8/85
RMC I.D.	769-85	ANALYZED BY	TED

ACID COMPOUNDS

	ug/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard A. Hodgens

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	Field Blank	DATE ANALYZED	5/8/85
RMC I.D.	769-85	ANALYZED BY	TED

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	17 ✓
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard L. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	Field Blank	DATE ANALYZED	4/10/85
RMC I.D.	769-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	<1.0 ND	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2 ND
1,1,1-trichloroethane	<1.0	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Kadgar

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-1	DATE ANALYZED	5/9/85
RMC I.D.	770-85	ANALYZED BY	TED

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-1	DATE ANALYZED	5/9/85
RMC I.D.	770-85	ANALYZED BY	TED

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5	benz(a)anthracene	<10
hexachlorobutadiene	<5 ND	chrysene	<10
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	<5
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard A. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-1	DATE ANALYZED	4/10/85
RMC I.D.	770-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	<1.0 ND	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2 ND
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard D. Hodgins

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-2	DATE ANALYZED	5/9/85
RMC I.D.	771-85	ANALYZED BY	TED

ACID COMPOUNDS

	µg/l
phenol	2710
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	27600
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-2	DATE ANALYZED	5/9/85
RMC I.D.	771-85	ANALYZED BY	TED

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	90	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	15	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	<5 ND
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodgson

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-2	DATE ANALYZED	4/10/85
RMC I.D.	771-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	6.2	benzene	143
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	60
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	3.0

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-3	DATE ANALYZED	5/8/85
RMC I.D.	772-85	ANALYZED BY	TED

ACID COMPOUNDS

	µg/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Lodge

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-3	DATE ANALYZED	5/8/85
RMC I.D.	772-85	ANALYZED BY	TED

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5 ND
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5 ND
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5 ND
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5 ND	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	12
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard D. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-3	DATE ANALYZED	4/10/85
RMC I.D.	772-85	ANALYZED BY	TED

VOLATILES

	ug/l		ug/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	3.8	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2 ND
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard A. Rodgers

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-4	DATE ANALYZED	5/9/85
RMC I.D.	773-85	ANALYZED BY	TED

ACID COMPOUNDS

	ug/l
phenol	<10 ND
2-chlorophenol	<10 ND
2-nitrophenol	<10 ND
2,4-dimethylphenol	<10 ND
2,4-dichlorophenol	<10 ND
4-chloro-3-methylphenol	<10 ND
2,4,6-trichlorophenol	<10 ND
2,4-dinitrophenol	<20 ND
4-nitrophenol	<40 ND
2-methyl-4,6-dinitrophenol	<20 ND
pentachlorophenol	<25 ND

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard A. Lodyga

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-4	DATE ANALYZED	5/9/85
RMC I.D.	773-85	ANALYZED BY	TED

BASE/NEUTRAL COMPOUNDS

	µg/l		µg/l
n-nitrosodimethylamine	<10 ND	4-chlorophenyl phenyl ether	<5 ND
bis(2-chloroethyl)ether	<5 ND	n-nitrosodiphenylamine	<10 ND
1,3-dichlorobenzene	<5 ND	1,2-diphenylhydrazine	<10 ND
1,4-dichlorobenzene	<5 ND	4-bromophenyl phenyl ether	<5 ND
1,2-dichlorobenzene	<5 ND	hexachlorobenzene	<5 ND
bis(2-chloroisopropyl)ether	<5 ND	phenanthrene	<5
hexachloroethane	<5 ND	anthracene	<5 ND
n-nitrosodi-n-propylamine	<5 ND	di-n-butyl phthalate	<5 ND
nitrobenzene	<5 ND	fluoranthene	<5
isophorone	<5 ND	benzidine	<100 ND
bis(2-chloroethoxy)methane	<5 ND	pyrene	<5
1,2,4-trichlorobenzene	<5 ND	butyl benzyl phthalate	<5 ND
naphthalene	<5	benz(a)anthracene	<10 ND
hexachlorobutadiene	<5 ND	chrysene	<10 ND
hexachlorocyclopentadiene	<5 ND	3,3'-dichlorobenzidine	<10 ND
2-chloronaphthalene	<5 ND	bis(2-ethylhexyl)phthalate	8.5 ✓
acenaphthylene	<5 ND	di-n-octyl phthalate	<10 ND
dimethyl phthalate	<5 ND	benzo(b)fluoranthene	<25 ND
2,6-dinitrotoluene	<10 ND	benzo(k)fluoranthene	<25 ND
acenaphthene	<5 ND	benzo(a)pyrene	<25 ND
2,4-dinitrotoluene	<10 ND	indeno(1,2,3-c,d)pyrene	<25 ND
fluorene	<5 ND	dibenz(a,h)anthracene	<25 ND
diethyl phthalate	<5 ND	benzo(g,h,i)perylene	<25 ND
		2,3,7,8-tetrachlorodibenzo-p-dioxin	<10 ND

< x ND= Not detected, value indicates minimum quantifiable limit.

< x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard D. Hodgens

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	W-4	DATE ANALYZED	4/10/85
RMC I.D.	773-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	3.4	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	<1.0 ND	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	<1.0 ND
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	<0.2 ND
1,1,1-trichloroethane	<1.0 ND	chlorobenzene	<1.0 ND
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S. Hodges

CERTIFICATE OF ANALYSIS

Summary of Organic Priority Pollutant Analysis

CLIENT	Woodward Clyde	DATE RECEIVED	4/10/85
CLIENT I.D.	Trip Blank	DATE ANALYZED	4/10/85
RMC I.D.	768-85	ANALYZED BY	TED

VOLATILES

	µg/l		µg/l
chloromethane	<5.0 ND	bromodichloromethane	<1.0 ND
bromomethane	<5.0 ND	1,2-dichloropropane	<5.0 ND
vinyl chloride	<5.0 ND	1,3-dichloropropene[1]	<5.0 ND
chloroethane	<5.0 ND	trichloroethene	<0.2 ND
methylene chloride	<1.0 ND	benzene	<1.0 ND
acrolein	<100 ND	dibromochloromethane	<1.0 ND
acrylonitrile	<25 ND	1,1,2-trichloroethane	<5.0 ND
1,1-dichloroethene	1.2	2-chloroethylvinyl ether	<5.0 ND
1,1-dichloroethane	<1.0 ND	bromoform	<5.0 ND
trans-1,2-dichloroethene	<1.0 ND	tetrachloroethene	2.7
chloroform	<1.0 ND	1,1,2,2-tetrachloroethane	<5.0 ND
1,2-dichloroethane	<5.0 ND	toluene	0.3
1,1,1-trichloroethane	<1.0	chlorobenzene	<1.0
carbon tetrachloride	<1.0 ND	ethylbenzene	<1.0 ND

[1] 1,3-cis-dichloropropene and 1,3-trans-dichloropropene could not be resolved, values reported indicate the sum of both compounds.

<x ND = Not detected, value indicates minimum quantifiable limit.
<x = Detected but at a concentration less than the minimum quantifiable limit indicated.

Approved By: Richard S Lodge